Adoption of the Healthy Heart Kit by Alberta Family Physicians

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ABSTRACT

Objective: The Healthy Heart Kit (HHK) is a risk management and patient education kit for the prevention of cardiovascular disease (CVD) and the promotion of CV health. There are currently no published data examining predictors of HHK use by physicians. The main objective of this study was to examine the association between physicians’ characteristics (socio-demographic, cognitive, and behavioural) and the use of the HHK.

Methods: All registered family physicians in Alberta (n=3068) were invited to participate in the “Healthy Heart Kit” Study. Consenting physicians (n=153) received the Kit and were requested to use it for two months. At the end of this period, a questionnaire collected data on the frequency of Kit use by physicians, as well as socio-demographic, cognitive, and behavioural variables pertaining to the physicians.

Results: The questionnaire was returned by 115 physicians (follow-up rate = 75%). On a scale ranging from 0 to 100, the mean score of Kit use was 61 [SD=26]. A multiple linear regression showed that “agreement with the Kit” and the degree of “confidence in using the Kit” was strongly associated with Kit use, explaining 46% of the variability for Kit use. Time since graduation was inversely associated with Kit use, and a trend was observed for smaller practices to be associated with lower use.

Conclusion: Given these findings, future research and practice should explore innovative strategies to gain initial agreement among physicians to employ such clinical tools. Participation of older physicians and solo-practitioners in this process should be emphasized.

Key words: Cardiovascular medicine; clinical practice guidelines; evidence based medicine; family medicine; primary care

Cardiovascular disease (CVD) is Canada’s leading cause of mortality and morbidity, with estimated direct and indirect costs of $7.2 and $12.4 billion respectively.1 Further, physicians report difficulty in meeting recommended standards for clinical practice guidelines related to CVD (and other chronic diseases) prevention and treatment. For example, only about half of all physicians routinely advise people who smoke, to quit.2 The multiplicity of risk factors and the heterogeneity of preventive guidelines are often cited as barriers in achieving such recommendations.3

Further, the adoption of a new behaviour of using new innovations – such as employing resource materials related to clinical practice guidelines – often requires a complex cognitive process. Although reports of various resource kits developed for physicians exist, little evaluative research has been conducted regarding physician use of such materials and individual-level determinants that shape their use. One such resource, the “Healthy Heart Kit” (HHK), was developed by Health Canada, the College of Family Physicians, and the Heart and Stroke Foundation.4 The HHK was launched in 1999 to provide physicians with practical guidelines and tools for the prevention of CVD.

The Kit includes training materials for the systematic assessment and management of six modifiable CVD risk factors (smoking, high blood pressure, high cholesterol, overweight, sedentary lifestyle, and diabetes), charts stickers and paper-based reminders, as well as patients’ information sheets. Integrated approaches for the management of multiple CVD risk factors have indeed been found to be superior in achieving recommended goals than non-integrated approaches.5 In 2001, the intersectoral partnership “Achieving Cardiovascular Health in Canada” (ACHIC) endorsed the HHK as a practical tool for the prevention of CVD.6,7 The HHK has demonstrated content validity and practical utility,6 however, no published study to date has examined its actual use or the determinants of its use by family physicians. Based on the literature on the uptake of new information by physicians8,9 potential predictors of HHK use include: the degree of agreement with the new clinical tool, confidence in using the new tool, the practice setting, academic affiliation (i.e., whether physicians hold a part-time appointment at a university hospital or not), time since graduation, number of hours spent in patient care, average duration of patient visits, and physicians’ health behaviours.

Our research objective was to investigate the association of the above listed characteristics with the frequency of HHK use by physicians.

METHODS

Study design
A one-group, cross-sectional design was employed to examine our research objective. A questionnaire was completed by family physi...
cians in the province of Alberta after using the HHK in their practice for a duration of two months. The questionnaire collected data on the frequency of using the HHK on patients with at least one cardiovascular risk factor. Physician’s socio-demographic, cognitive and behavioural data were also collected. Participating physicians were asked to return the completed questionnaire in a provided self-addressed, stamped envelope. A post-card reminder was mailed to all non-responding physicians two weeks after the initial mailing. A final reminder letter, containing a new copy of the questionnaire and a self-addressed stamped envelope, was sent two weeks later. The study protocol was approved by the Health Research Ethics Board of the University of Alberta. All data were treated in a confidential manner.

**Study population**

All registered family physicians in Alberta (n=3068) were invited to participate in the study. Physicians were contacted for study recruitment through direct mailing from the Alberta College of Family Physicians (ACFP). This initial mailing included an information letter inviting physicians to take part in the study, and a written consent form to be returned to ACFP in a provided self-addressed, stamped envelope. To be eligible, physicians had to be registered within the ACFP. Participants were blinded to the study objective to limit the risk of information bias.

**Intervention**

Physicians who took part in our study were sent a Kit between July and September 2006, with the “Guidelines for Management of Modifiable Risk Factors in Adults at High Risk for Cardiovascular Events” published by the Alberta Medical Association.10 Physicians were asked to test the Kit in their practice for two months.

**Data collection: Measures**

The frequency with which physicians used the Kit with appropriate patients (those with at least one cardiovascular risk factor) was conceived as the dependent variable and was assessed and reported by the participating physicians on a visual analogue scale ranging from 0 (almost never) to 100 (almost always). Visual Analogue Scales have been used extensively to assess a variety of constructs from 0 to 100 (almost always). Visual Analogue Scales have been used extensively to assess a variety of constructs in health and medical fields, and have demonstrated substantial correlations with Likert-type scales.11

Socio-demographic variables collected in the questionnaire were gender, year of graduation from medical school, practice setting, number of hours per week spent in patient care, average visit duration with patients, and whether affiliated with an academic institution. Behavioural variables consisted of the physicians’ smoking status, diet and physical activity (PA) habits. In addition, physicians’ preventive practices with their patients prior to the study were assessed by asking them to rate on a four-point scale ranging from “never=1” to “frequently=4” the frequency with which they deliver the following services to their patients: weigh patients; calculate BMI; calculate coronary heart disease risk; counsel to cease smoking; counsel to increase PA; and, counsel to improve diet. An overall percentage score of preventive practices was created using the above six individual ratings. Table 1 details the socio-demographic and behavioural characteristics.

Cognitive variables included: an 11-item scale assessed the overall agreement with the Kit with response options ranging from “strongly disagree=1” to “strongly agree=5”. The 11 positively framed statements assessed the HHK’s usefulness, effectiveness, relevance, credibility, ease of use, understandability, compatibility with physician beliefs, benefits and adaptability. The scale score was obtained by adding the individual scores of agreement, and then transforming the resulting sum to a 0 to 100 scale. A similar measure assessed agreement with the Guidelines for Management of Modifiable Risk Factors in Adults at High Risk for Cardiovascular Events. Confidence in being able to use the Kit was assessed on a 9-point Likert-type scale (e.g., 1=not at all confident; 9=completely confident). The degree of control while using the Kit was assessed on a similar scale (e.g., 1=very little control; 9=complete control).

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**Figure 1. Flow of participants through the different steps of the inclusion process**

- All registered family physicians in Alberta were invited by letter to participate in the “Healthy Heart Kit” Study (n=3068)
- Did not send back the response envelope with the consent form or refused to participate (n=2915)
- Agreed to participate in the study and sent back the consent form (n=153)
- Received the HHK with instructions on its use (n=153)
- Received the survey questionnaire two months later (n=153)
- Did not send back the survey questionnaire after two written reminders (n=38)
- Sent back the completed questionnaire (n=115)

**Table 1. Sample Characteristics (n=114 unless otherwise specified)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52.6 (60)</td>
</tr>
<tr>
<td>Female</td>
<td>47.4 (54)</td>
</tr>
<tr>
<td>Year of graduation</td>
<td></td>
</tr>
<tr>
<td>≤1969</td>
<td>11.4 (13)</td>
</tr>
<tr>
<td>1970-1989</td>
<td>50.0 (57)</td>
</tr>
<tr>
<td>≥1990</td>
<td>38.6 (44)</td>
</tr>
<tr>
<td>Practice setting</td>
<td></td>
</tr>
<tr>
<td>Solo practice</td>
<td>14.0 (16)</td>
</tr>
<tr>
<td>Group practice</td>
<td>71.1 (81)</td>
</tr>
<tr>
<td>Outpatient clinic</td>
<td>14.9 (17)</td>
</tr>
<tr>
<td>Academic affiliation</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>36.0 (41)</td>
</tr>
<tr>
<td>No</td>
<td>64.0 (73)</td>
</tr>
<tr>
<td>Time spent in patient care</td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>4.4 (5)</td>
</tr>
<tr>
<td>20-40</td>
<td>33.3 (38)</td>
</tr>
<tr>
<td>&gt;40</td>
<td>62.3 (71)</td>
</tr>
<tr>
<td>Average duration of visits</td>
<td></td>
</tr>
<tr>
<td>0-10</td>
<td>25.4 (29)</td>
</tr>
<tr>
<td>11-20</td>
<td>70.2 (80)</td>
</tr>
<tr>
<td>&gt;20</td>
<td>4.4 (5)</td>
</tr>
<tr>
<td>Smoking status (n=112)</td>
<td></td>
</tr>
<tr>
<td>Current smoker</td>
<td>1.8 (2)</td>
</tr>
<tr>
<td>Former smoker</td>
<td>17.0 (19)</td>
</tr>
<tr>
<td>Never smoker</td>
<td>80.2 (91)</td>
</tr>
<tr>
<td>Moderate intensity physical</td>
<td></td>
</tr>
<tr>
<td>activity level (n=112)</td>
<td></td>
</tr>
<tr>
<td>≤1d/wk with 30 min. mod.</td>
<td>10.7 (12)</td>
</tr>
<tr>
<td>intensity PA</td>
<td>54.5 (61)</td>
</tr>
<tr>
<td>≥2 d/wk with 30 min.</td>
<td>34.8 (39)</td>
</tr>
<tr>
<td>min. of mod. intensity PA</td>
<td></td>
</tr>
<tr>
<td>Buy low-fat food</td>
<td></td>
</tr>
<tr>
<td>Never/seldom</td>
<td>8.8 (10)</td>
</tr>
<tr>
<td>Occasionally</td>
<td>14.9 (17)</td>
</tr>
<tr>
<td>Often/Very often</td>
<td>76.3 (87)</td>
</tr>
</tbody>
</table>

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The content validity of the measures assessing the agreement of the Kit were based on the Diffusion of Innovation Theory which considers factors such as its relative advantage, consistency with values of the adaptor, complexity, the degree to which it may be experimented (trialability), and its visibility of its results to others. The degree of control and confidence of using the Kit were based on the Theory of Planned Behavior (TPB) and Self-Efficacy Theory (SET). Perceived behavioural control (i.e., the perceived ease or difficulty of performing the behaviour) and self-efficacy (i.e., perceived confidence in performing the recommended behaviour) are core tenants of TPB and SET respectively.

**Statistical analysis**

The nonparametric test for trend was used to assess the statistical significance of trends across practice settings. Multiple regression models were built using a purposeful selection method. Univariate linear regression was conducted with each potential predictor of Kit use. All variables significant at a p-value < 0.2 were then selected as candidates for three multiple regression models (i.e., socio-demographic, cognitive, and behavioural). A combined model was also tested in which all eligible variables from the single variable regression analyses (with p<0.2) were simultaneously entered. In the final model, those variables that were not significant (at the p<0.05 level) in the first combined model were removed.

**RESULTS**

153 physicians agreed to participate in the study and received the HHK. 115 survey questionnaires were returned at the 2-month follow-up (follow-up rate = 75%). Figure 1 shows the flow of participants through the inclusion and follow-up process. Participating physicians were predominantly male (53%), worked in group practices or clinics (86%), and graduated before 1990 (61%). Table 1 displays the detailed baseline characteristics of respondents. The mean score of Kit use (dependent measure) was 61 [SD=26].

**Socio-demographic model:** Single and multiple variable associations between the score of Kit use and the socio-demographic variables (gender, year of graduation, practice setting, academic affiliation, and visit duration) were not statistically significant (Table 2, Model 1). There was a statistically significant trend for smaller practices to be associated with lower scores of Kit use with means of 51 [SD=29] for solo practice, 60 [SD=23] for group practice, and 70 [SD=32] for clinical settings; p-value for the nonparametric test for trend was 0.018 (z=2.37).

**Cognitive model:** The scale employed to assess agreement with the Kit demonstrated strong inter-item correlation (reliability), with a Cronbach's alpha coefficient of 0.92. The mean score of agreement was 77 [SD=14]. This measure, together with the other cognitive variables (agreement with the guidelines, control in using the Kit, and confidence in using the Kit) were strongly associated (p<0.001)
in single variable analyses with the kit use score. "Agreement with the Kit" and "confidence in using the Kit" remained as strong independent cognitive predictors of Kit use in the multiple linear regression model, and explained 46% of its variability (Table 2, Model 2).

**Behavioural model:** Behavioural variables, i.e., initial preventive practices with patients, and physicians' own health behaviours) were not associated with Kit use either in single or in multiple variable analyses (Table 2, Model 3).

**Combined models:** Finally, in the combined models, year of graduation was a significant predictor of Kit use in addition to the cognitive variables "agreement with the Kit" and "confidence in using the Kit". Compared with those who graduated before 1970, those who graduated between 1970-1989 scored 9 points higher on Kit use, whereas those who graduated since 1990 scored 14 points higher on Kit use (Table 2, Combined Model, second column). A one-point increase in the agreement with the Kit and the degree of confidence in using the Kit resulted respectively in a 1 and 6 points increase on Kit use.

**DISCUSSION**

Practice-based research is advocated to better understand which factors influence how evidence-based guidelines can best be translated into actual care delivery. In this study assessing physician practice, a theory-driven score of agreement with a CV risk management Kit and the degree of confidence in using such tools were shown to be strongly associated with its reported use. Results also suggest that a more recent graduation year is also a significant predictor of Kit use. A trend for smaller practices to be associated with lower scores of Kit use was also shown.

Similar to our findings, other studies have found physicians in solo practices to be less prone to adopt new clinical practices compared to physicians in group practices or working in outpatient clinics. This may be partly attributed to greater opportunities for collegial input, influence of respected opinion leaders, and exchange of knowledge in the latter. As physicians in solo practices represent about one quarter of all family physicians in Alberta, this trend should raise the question of the need to adopt specific implementation strategies for physicians in this particular setting.

For example, solo practitioners could be encouraged to build or engage in primary-care networks.

Our findings also show that time since graduation was inversely associated with Kit use. Interestingly, a recent systematic review found an inverse relationship between clinical experience and quality of health care. Of 62 published studies that measured physician knowledge or quality of care (and described time since medical school graduation or age), more than half of the studies suggested that physician performance declined over time for all measured outcomes, with only one study demonstrating improved performance for all assessed outcomes.

Low participation rates when recruiting primary care physicians as participants is a well-recognized barrier to practice-based research. For example, Sin obtained a 7.1% mail-out recruitment rate in an asthma study which fell to 5.1% when Alberta physicians were contacted for access to their patient charts; this is comparable to the 5.0% recruitment rate in our study.

Self-selection of physicians (e.g., with a particular interest in preventive practices) cannot be excluded as a potential study limitation and may have limited the external validity of our findings.

Our sample, however, appears to reflect demographic and behavioural practice profiles reported in other studies involving Alberta family physicians. In the 2001 National Family Physicians Workforce Survey (NFPWS), the 2,274 Alberta family physicians who completed a mail survey had very similar age group and practice setting proportions to our study. Further, physicians in our sample reported relatively similar rates of smoking cessation counselling (97.4% vs. 90.5% in the NFPWS survey) and PA counselling (91.2% vs. 89.6% in the NFPWS survey).

A study limitation was that there were no objective measures regarding the frequency of HHK use. As data collection was based on self-report, a social desirability bias cannot be excluded. Physicians may have over-reported professionally-valued opinions or behaviours. This phenomenon would however not affect our findings, as long as such over-reporting was uniformly distributed across the ranges of the variables retained in our final model. Standardized patients would also have provided a valuable additional source of information to assess whether and how the HHK was actually used. Physicians participating in the study did not receive any specific training on how to use the Kit. Such training may have significantly improved the adoption of the Kit. Future studies on this topic should consider combining qualitative and quantitative approaches in order to better understand how physicians’ characteristics influence the adoption of new clinical tools.

In summary, this study found that being a younger physician, working in a group practice or a clinic, reporting a high degree of agreement with positive statements about the Kit, and a high confidence level in using the Kit were all associated with a higher score of Kit use. Future research should explore whether agreement with a new clinical tool might be influenced by gaining support and involvement of practitioners (including older physicians and solo practitioners) at the development stages, and whether increasing confidence in using this tool might be influenced by choosing an implementation strategy allowing physicians to familiarize themselves and have personalized feedback on how to best use such a tool.

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RÉSUMÉ

Objectif : La trousse Cœur en santé est une trousse de gestion des risques et d’éducation des patients pour la prévention des maladies cardiovasculaires et la promotion de la santé cardiovasculaire. Actuellement, il n’existe aucune donnée publiée examinant les indicateurs prévisionnels pour l’utilisation de la trousse Cœur en santé par les médecins. Le principal objectif de cette étude est d’examiner l’association entre les caractéristiques des médecins (socio-démographiques, cognitives et comportementales) et l’utilisation de la trousse.

Méthode : Tous les médecins de famille de l’Alberta (n=3068) ont été invités à participer à l’étude sur la « trousse Cœur en santé ». Les médecins consentants (n=153) ont reçu la trousse et on leur a demandé d’utiliser pendant deux mois. À la fin de cette période, un questionnaire a permis de recueillir les données sur la fréquence de l’utilisation de la trousse par les médecins, ainsi que les variables socio-démographiques, cognitives et comportementales relatives aux médecins.

Résultats : Le questionnaire a été retourné par 115 médecins (taux de suivi = 75 %). Sur une échelle allant de 0 à 100, la note moyenne pour l’utilisation de la trousse était de 61 [écart type=26]. Une régression linéaire multiple a démontré que « le consentement à utiliser la trousse » et le degré de « confiance dans l’utilisation de la trousse » étaient fortement associés à l’utilisation de la trousse, ce qui explique 46 % de la variabilité de l’utilisation de la trousse. Le temps écoulé depuis l’obtention du diplôme était inversement associé à l’utilisation de la trousse, et on a observé une tendance pour les plus petits cabinets associés à une utilisation moins fréquente.

Conclusion : Étant donné ces résultats, les prochaines recherches et les prochains exercices devraient examiner des stratégies innovatrices pour obtenir l’accord initial parmi les médecins d’ employer de tels outils cliniques. La participation des médecins plus âgés et des médecins exerçant seuls à ce processus devrait être mise en évidence.

Mots clés : médecine cardiovasculaire; lignes directrices sur les pratiques cliniques; médecine fondée sur des preuves; médecine de famille; soins primaires